

### **REMARKS**

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1-24 are presently active in this case. The present Amendment adds Claims 17-24.

In the outstanding Office Action, Claims 1, 3-7, 9, 10, 12-16 were rejected under 35 U.S.C. 102(b) as being anticipated by Nakamura et al. (U.S. Patent 6,005,987, herein referred as "Nakamura"), Claims 2, 8 and 11 were rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura in view of Iijima et al. (U.S. Patent 6,445,814, herein referred as "Iijima"), and Claims 1, 6, 7, 9, 15, and 16 were provisionally rejected under the judicially created doctrine of equivalents of obviousness-type double patenting as being unpatentable over claims 4, 11 and 18 of co-pending Application No. 09/645,511 in view of Nakamura.

In response to the rejection of Claims 1, 3-7, 9-10, 12-16 under 35 U.S.C. § 102(b), Applicants respectfully request reconsideration of this rejection and traverse the rejection, as discussed next.

Briefly recapitulating, Applicants' invention, as recited in Claim 1, relates to an image processing method for correcting image distortions caused by oblique imaging. The correction includes a step of generating a distortion-corrected image on a projection plane by projecting the standard image onto the projection plane based on the direction of the object plane. Applicants' invention improves upon conventional image processing methods for oblique imaging when using a plurality of partially overlapping images. The claimed invention leads to improved image distortion correction caused by oblique imaging by using a projection of a standard image to a projection plane.<sup>1</sup>

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<sup>1</sup> See Applicants' specification for example at page 6, lines 1-21.

Turning now to the applied prior art, Nakamura discloses a picture image forming apparatus for forming panoramic pictures, correcting the differences in the fields of view of the imaging means, and where deviations of images in the overlap regions are corrected by the picture image parallax sampling and processing unit.<sup>2</sup> However, Nakamura fails to teach the projecting of a standard image into a projecting plane based on the direction of an object plane. Nakamura in particular is completely silent on anything teaching a projection of an image into a projection plane. On the contrary, Nakamura explicitly teaches that a search is carried out in the picture image in order to calculate a deviation between the images of the object caused by parallax and therefore, the region for calculating the search correlation value may be moved *only in the horizontal direction*.<sup>3</sup> The deviation amount is an amount of apparently moving a body due to the parallax. The amount is caused by the depth and accordingly, the depth of the body represented by the images of the object in the reference regions can be estimated *from the direction of deviation and the amount of deviation*.<sup>4</sup> Nakamura also discloses that a calculating means calculates differences in angle and size of the images of the object in the two divided picture images and subjects the divided picture images to rotational transformation and magnification or reduction such that the calculated differences in angle and size cancel each other, respectively.<sup>5</sup> Parallax compensation by *calculating the direction of deviation and the amount of deviation*, as taught by Nakamura, is not a projection of a standard image into a projection plane, as recited in Applicants' independent Claim 1, or related features recited in the other independent claims.

In view of the above, the cited prior art fails to teach or suggest every feature recited in Applicants' claims, so that Claims 1-24 are believed to be patentably distinguishable over

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<sup>2</sup> See the Nakamura patent in the Abstract.

<sup>3</sup> See the Nakamura patent at column 14, lines 22-26.

<sup>4</sup> See the Nakamura patent at column 14, lines 27-31.

<sup>5</sup> See the Nakamura patent at column 4, lines 58-64.

the cited prior art. Accordingly, Applicants respectfully traverse, and request reconsideration of, the rejections based on the Nakamura patent.<sup>6</sup>

Applicants respectfully further traverse the rejection of Claims 2, 8 and 11 under 35 U.S.C. § 103(a) because there is no sufficient evidence of record for the required motivation to modify the Nakamura invention by incorporating Iijima's selecting step where one of a plurality of partially overlapping images is automatically selected as the standard, based on a ratio of an area of an object to an entire area of an image, for the following reasons.<sup>7</sup>

The outstanding Office Action states that it would have been obvious to incorporate Iijima's image selection by ratio of an area of an object to an entire area of an image because Iijima's ratio provides a measure for precisely obtaining characteristic points.<sup>8</sup> The record, however, fails to provide the required evidence of a motivation for a person of ordinary skill in the art to perform such modification. While the Iijima patent may provide a reason for a three dimensional information processing apparatus for obtaining three-dimensional information from an object having a three-dimensional shape, the Iijima patent fails to suggest why a person of ordinary skill in the art would be motivated to incorporate such a feature in an image forming apparatus for producing a panoramic picture by compositing picture images dividedly imaged, such as the one disclosed in Nakamura. In particular, the Iijima patent states that a distance information distribution processor 116' calculates the distance information distribution using the principle of trigonometric measurements on the

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<sup>6</sup> See MPEP 2131: "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference," (Citations omitted) (emphasis added). See also MPEP 2143.03: "All words in a claim must be considered in judging the patentability of that claim against the prior art."

<sup>7</sup> See MPEP 2143.01 stating "[o]bviousness can only be established by combining or modifying the teaching of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art," (citations omitted). See also MPEP 2144.08 III stating that "[e]xplicit findings on motivation or suggestion to select the claimed invention should also be articulated in order to support a 35 U.S.C. 103 ground of rejection. . . Conclusory statements of similarity or motivation, without any articulated rational or evidentiary support, do not constitute sufficient factual findings."

<sup>8</sup> See outstanding Office Action at page 9, lines 3-6.

basis of the relationship among the corresponding points<sup>9</sup> and further teaches that since image sensing is performed at a plurality of positions  $A_0$  to  $A_n$ , all the sensed images do not always include the background plane 3 with a size large enough to precisely obtain characteristic corresponding points.<sup>10</sup> Iijima, however, does not suggest that its selection of an partial image by ratio of an area of an object to an entire area of an image would work in a picture image forming apparatus for forming a composite panoramic picture image form a plurality of still digital picture images, much less for compensating parallax caused by a difference in depth of an object. Iijima does not state that a panoramic picture image forming apparatus needs three-dimensional shape information determined on the basis of an area ratio of a pad that places the object thereon to an image sensing region.<sup>11</sup>

In addition, Nakamura is not concerned with the extraction of reliable three-dimensional shape information for CAD software.<sup>12</sup> Instead, Nakamura is concerned in forming panoramic picture images from a plurality of digital still image pictures. Nakamura states that its structure already achieves the goal of correcting differences in parallaxes and difference in angle of the images of the objects.<sup>13</sup> Nakamura does not suggest that further improvement is desired, nor that another feature should be added to further improve the calculation of a deviation between the images of the object caused by parallax.<sup>14</sup> In particular, Nakamura does not suggest to add an image selection by ratio of an area of an object to an entire area of an image, such as those disclosed in Iijima.

The Nakamura and Iijima patents, therefore, do not provide the motivation to perform the proposed modification of the Nakamura device. In other words, an attempt to bring in the isolated teaching of Iijima 's image selection by ratio of an area of an object to an entire area

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<sup>9</sup> See the Iijima patent, for example at column 19, lines 46-52.

<sup>10</sup> See the Iijima patent for example at column 22, line 54 to column 23, line 8.

<sup>11</sup> See the Iijima patent for example at column 5, lines 48-52.

<sup>12</sup> See the Iijima patent for example at column 1, lines 5-10.

<sup>13</sup> See the Nakamura patent for example, at column 4, lines 30-44.

<sup>14</sup> See the Nakamura patent for example, at column 14, lines 17-31.

of an image into Nakamura would amount to improperly picking and choosing features from different references without regard to the teachings of the references as a whole.<sup>15</sup> While the required evidence of motivation to combine need not come from the applied references themselves, the evidence must come from *somewhere* within the record.<sup>16</sup> In this case, the record fails to support the proposed modification of the Nakamura system and Applicants respectfully traverse the rejection of Claims 2, 8 and 11.

In order to vary the scope of protection recited in the claims, new Claims 17-24 are added. New Claims 17-22 recite a perspective projection matrix operation.<sup>17</sup> New Claim 23 recites that the perspective projection matrix is calculated based on coordinates of at least four combinations of feature points of the standard image and matched points corresponding thereto.<sup>18</sup> New Claim 24 recites that a least-square-method is used to find parameters of said projection matrix.<sup>19</sup> New Claims 17-24 therefore find support in the disclosure as originally filed and are not believed to raise a question of new matter.<sup>20</sup> The prior art fails to teach or suggest the features recited in the new claims.

In response to the provisional obviousness-type double patenting rejection, because this rejection is believed to be the only remaining rejection in this case, Applicants respectfully request that this rejection be withdrawn, per MPEP 806-I-B, last paragraph.

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<sup>15</sup> See In re Ehrreich 590 F.2d 902, 200 USPQ 504 (CCPA, 1979) (stating that patentability must be addressed "in terms of what would have been obvious to one of ordinary skill in the art at the time the invention was made in view of the sum of all the relevant teachings in the art, not in view of first one and then another of the isolated teachings in the art," and that one "must consider the entirety of the disclosure made by the references, and avoid combining them indiscriminately.")

<sup>16</sup> In re Lee, 277 F.3d 1338, 1343-4, 61 USPQ2d 1430 (Fed. Cir. 2002) ("The factual inquiry whether to combine references ... must be based on objective evidence of record. ... [The] factual question of motivation ... cannot be resolved on subjective belief and unknown authority. ... Thus, the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion").

<sup>17</sup> See Applicants' specification for example at page 33, line 21 to page 34, line 17.

<sup>18</sup> See Applicants' specification for example at page 34, lines 9-17.

<sup>19</sup> See Applicants' specification for example at page 35, lines 4-15.

<sup>20</sup> See MPEP 2163.06 stating that "information contained in any one of the specification, claims or drawings of the application as filed may be added to any other part of the application without introducing new matter."

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal Allowance. A Notice of Allowance for Claims 1-24 is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicant's undersigned representative at the below listed telephone number.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.



Gregory J. Maier  
Attorney of Record  
Registration No. 25,599

Philippe J. C. Signore, Ph.D.  
Registration No. 43,922



**22850**

Tel. (703) 413-3000  
Fax (703) 413-2220  
GJM/PJCS/NPS/maj  
I:\ATTY\NS\00557\213278US\213278US-AM1-DRAFT2.DOC